

A NOVEL INGREDIENT AND USE OF SAME

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

10 The present invention relates to a novel ingredient and use
of same. More particularly, it relates to a novel polymer
having a multiple number of urethane moieties, ester linkages,
amides, and quaternary functionalities (hereinafter
"polyurethane polyesterquat"). Even more particularly, the
present invention relates to the use of polyurethane
polyesterpolyquat in a variety of personal care, hair care and
cosmetic products to provide water resistance, shine, gloss,
15 surface smoothening, and/or film-forming benefits.

2. Description of the Prior Art

20 Water resistance, shine, gloss, surface smoothening, and
film-forming are all attributes that are desired in many
personal care, hair care and cosmetic products, preparations and
compositions. For example, water resistance is a much-desired
quality amongst consumers of color cosmetics, lipsticks, eyelash
mascara, insect repellents and sunscreen preparations.

Additionally, shine and gloss are much desired attributes in nail color and hair care preparations. Surface smoothening may be important in a shampoo, hair conditioner, styling mousse and other hair treatment preparation. This attribute may provide
5 for more superior wet and dry hair combing. Film-forming is a desired attribute in a body wash, liquid soap, hair color and skin care preparation, amongst other products.

There is a desire for a single ingredient that, when incorporated into such compositions, can deliver multi-
10 functionality to the formulated composition, particularly the aforementioned desired attributes or benefits. This result is now attainable in a composition that simply has an effective amount of a single compound, namely a polyurethane
15 polyesterpolyquat. This single compound delivers multiple performance advantages to a composition that heretofore required the use of a number of different ingredients. Furthermore, these performance advantages have not been achieved by known monomeric esterquats.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide compositions that have water resistance, shine, gloss, surface
5 smoothening and/or film-forming properties.

It is another object of the present invention to provide a composition having a polyurethane polyesterpolyquat.

10 It is a further object of the present invention to provide a method of topically applying a composition containing a polyurethane polyesterpolyquat to a substrate, such as skin, hair, lips or nails, to provide water resistance, shine, gloss, surface smoothening and/or film-forming to such substrate.

15 These and other objects and advantages of the present invention are achieved by a composition having a polyurethane polyesterpolyquat. The polyurethane polyesterpolyquat composition is a personal care, hair care or cosmetic
20 composition.

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wherein R_6 is C_6H_{13} , R_{10} is $CH_2CH=CH(CH_2)_7$, and $n=4$ to 40 , preferably 8 to 25 , more preferably 10 to 15 .

The process of synthesizing the above polyurethane polyesterpolyquat is as follows. The first step is an esterification of TEA (triethanolamine) and ricinoleic acid to form esters called TEA Ricinoleate. The next step is the polymerization of TEA Ricinoleate with isophorone diisocyanate (IPDI) to form TEA diricinoleate/IPDI copolymer. The third step is the quaternization of the TEA diricinoleate/IPDI copolymer with the quaternizing agent diethyl sulfate to form the preferred polyurethane polyesterpolyquat.

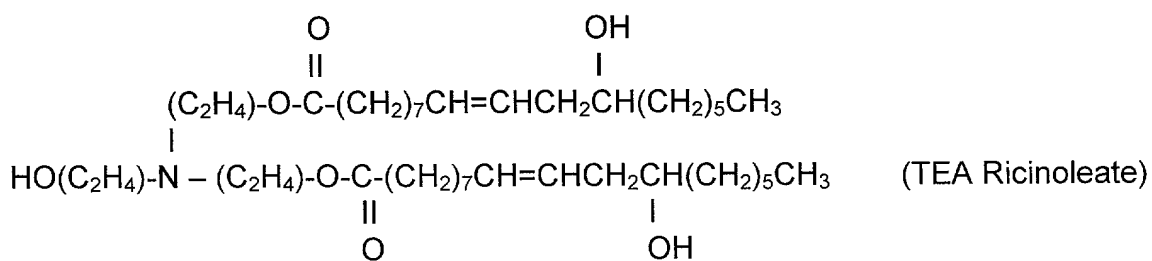
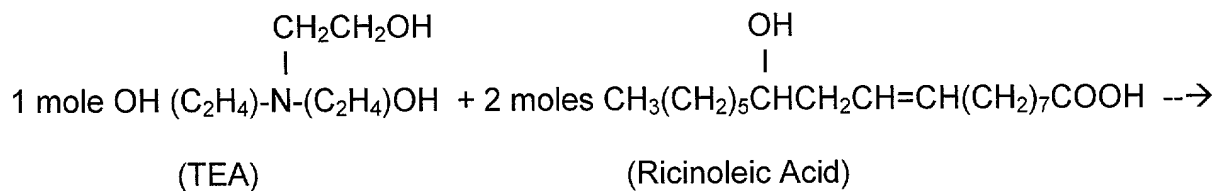
A polyurethane polyesterpolyquat as described above, can be structurally generalized as follows:



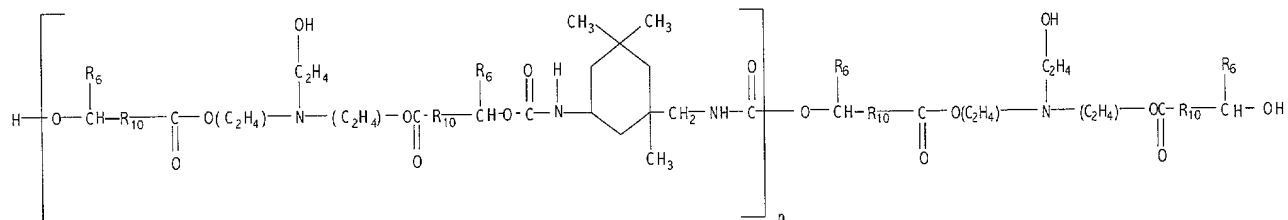
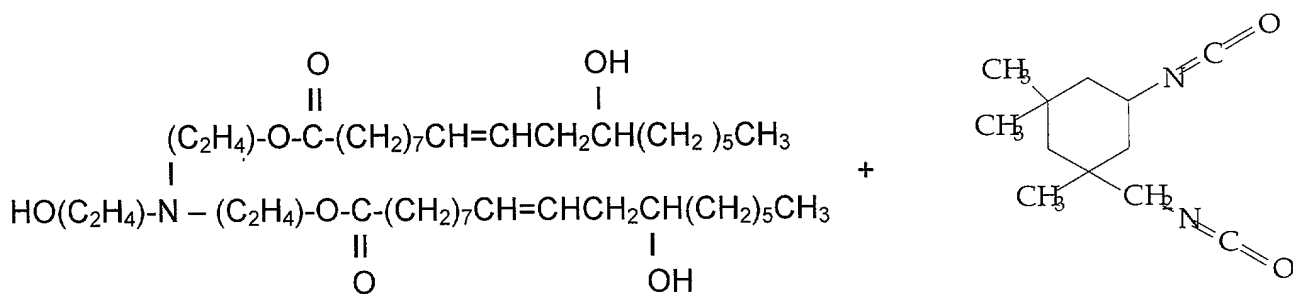
wherein X = degree of esterification of TEA with Fatty Acid (FA) and ranges from 1 (monoester) to 3 (triester), but it is most preferably equal to 2 (i.e., the diester).

The chemical structures corresponding to the reaction steps of the preferred polyurethane polyesterpolyquat above are outlined below:

Reaction Step 1:

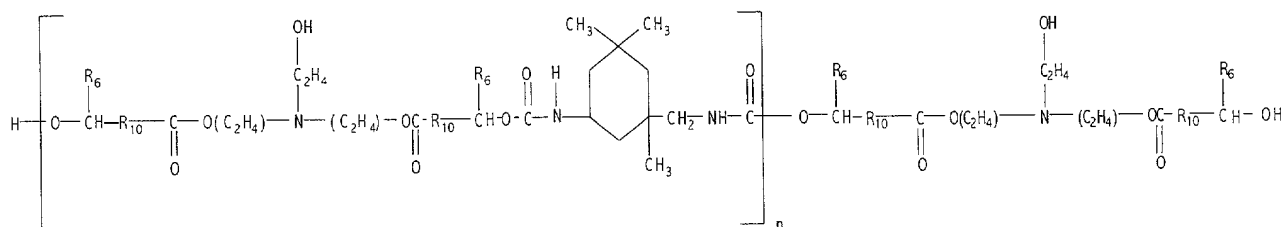


Reaction Step 2:

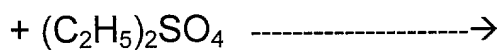


Reaction Step 3:

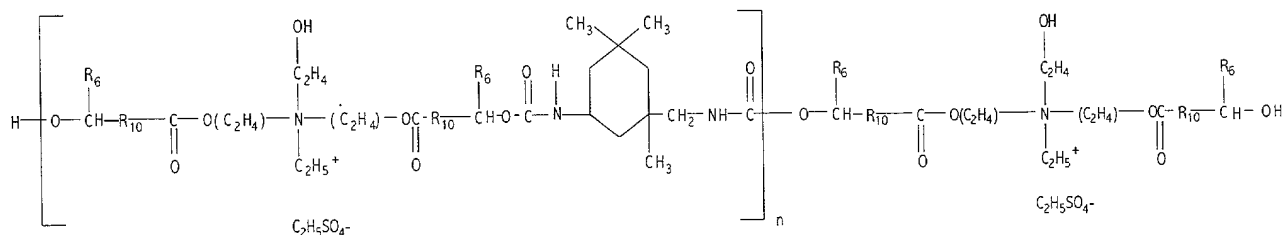
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The chemical structure of this compound has several functional groups, such as ester bonds, amide bonds, carbamate bonds (urethane bonds) and hydrophobic modification, within the compound. Because of the multifunctional groups within the compound, this compound delivers multi-functionality and multiple benefits to the formulated products.

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The polyurethane polyesterpolyquat of the present invention can be made with any fatty acid with free hydroxyl groups.

Ricinoleic acid is preferred because it has a hydroxyl functional group that can be polymerized with IPDI. It is most preferred that a triethanolamine fatty acid diester is formed. The formation of the diester, rather than monoester or triester, can be facilitated by using two moles of fatty acid for every mole of triethanolamine. Even so, monoesters and triesters may form and thus be incorporated into the polyurethane polyesterpolyquat. Preferably, the polyurethane polyesterpolyquat includes over 50% diesters, more preferably over 75% diesters, and most preferably over 90% diesters. A high percentage of triester is less preferred, because the more triesters that the polyurethane polyesterpolyquat has incorporated therein, the more solid it will be.

The polyurethane polyesterpolyquat of the present invention may be added to personal care, hair care and cosmetic products, including, but not limited to, a shampoo, hair conditioner, hair styling mousse, mascara, color cosmetic, lipstick, body wash, liquid soap, hair color, nail care preparation (e.g. enamel), hair treatment preparation, and skin care preparation, in an amount effective to provide and/or enhance water resistance, shine, gloss, surface smoothening, and/or film-forming.

The compositions of the present invention preferably have the polyurethane polyesterpolyquat present in an amount about 0.005 weight percent or percentage by weight (wt%) to about 40 wt% based on the total weight of the composition. More preferably, the present compositions have polyurethane polyesterpolyquat present in an amount about 0.01 wt% to about 20 wt%. Most preferably, the present compositions have polyurethane polyesterpolyquat present in an amount about 0.1 wt% to about 10 wt% based on the total composition.

When used in a hair conditioner composition, the composition preferably has the polyurethane polyesterpolyquat present in an amount about 0.1 wt% to about 8 wt%, and more preferably in an amount about 0.5 wt% to about 3 wt%, based on the total weight of the composition. The polyurethane polyesterpolyquat provides for superior conditioning compared to conventional monomeric esterquats. Further, such hair care compositions that include the polyurethane polyesterpolyquat provide for longer-lasting styling hold, measured by curl retention, at high humidity conditions. Additionally, in hair care products, the instant polyurethane polyesterpolyquat helps deliver both conditioning and styling benefits, even from a single rinse-off product.

When used in a hair styling composition, the composition most preferably has a polyurethane polyesterpolyquat present in an amount about 0.3 wt% to about 10 wt%, based on the total weight of the total composition. Optimally, when the hair styling composition is a styling gel, the polyurethane polyesterpolyquat is present in an amount about 0.3 wt% to about 1 wt%, based on the total weight of the composition.

When used in a body wash composition, the composition more preferably has the polyurethane polyesterpolyquat present in an amount about 0.5 wt% to about 4 wt%, based on the total weight of the composition.

The compositions of the present invention may include one or more additional components, such as one or more antimicrobials, antioxidants, buffering agents, chelating agents, colorants, conditioning agents, emollients, emulsifiers (e.g., anionic, cationic or nonionic), film formers, fragrances, humectants, lubricants, moisturizers, pigments, preservatives, skin penetration enhancers, stabilizers, surfactants, thickeners, viscosity modifiers, vitamins, or any combinations thereof.

The hair care compositions of the present invention may be of the type including, but not limited to, a conditioning shampoo, a rinse-off conditioner, a leave-on conditioner, mousse, styling gel, hair color preparation or any combinations thereof.

When in the form of a shampoo, the hair care compositions of the present invention typically have one or more surfactants present in an amount required to clean the hair, preferably about 5 wt% to about 20 wt% based on the total weight of the composition. The surfactants in shampoo compositions may include anionic, nonionic or amphoteric surfactants, or mixtures of these surfactants. When in the form of a leave-on conditioner, the compositions of the present invention preferably have a relatively smaller amount of a non-ionic surfactant typically in the range about 0.01 wt% to about 3.0 wt% based on the total weight of the composition. When in the form of a leave-on conditioner, the compositions preferably have a fatty alcohol and an ethoxylated fatty alcohol having from about 12 to about 36 carbon atoms. Such fatty alcohol and ethoxylated alcohol are typically present in an amount about 0.01 wt% to about 5.0 wt% based on the total weight of the composition. Examples of such fatty alcohols include, but are not limited to lauryl alcohol, cetyl alcohol, stearyl alcohol,

behenyl alcohol, or any combinations thereof. Examples of such ethoxylated fatty alcohols include all fatty alcohols with the ethoxylation from 2 moles to 30 moles.

5 The present compositions typically have a vehicle. The vehicle should be a physiologically acceptable or suitable vehicle. A "physiologically acceptable vehicle" or a "suitable vehicle" means any vehicle for a drug, cosmetic or medicament that is suitable for use in direct, safe contact with human
10 tissues. The polyurethane polyesterpolyquat is preferably incorporated into a suitable topical vehicle to form a topical formulation prior to applying.

15 The compositions of the present invention may have a number of different product forms. Such suitable product forms include a cream, aerosol or pump spray, mousse, foam, gel, lotion, stick, pomade, solution, or incorporated into a patch or towelette.

20 The following are examples of compositions having the polyurethane polyesterpolyquat.

Shampoo

Ingredient	Weight %
Distilled water	QS
Guar Hydroxypropyltrimonium Chloride	0.4
citric acid	0.1
Disodium EDTA	0.1
Methylparaben	0.2
Cocamide MEA	2.0
Glycol Distearate	0.75
Na Lauryl Ether Sulfate	18.0
Polyurethane polyesterpolyquat	1.0
Fragrance	0.5
Methylisothiazolinone, Methylchlorisothiazolinone	0.066

Conditioner

Ingredient	Weight %
Distilled water	QS
HEC and Dialkyldimethyl Ammonium Chloride	0.25
Polyurethane polyesterpolyquat	2.0
citric acid	0.3
Disodium EDTA	0.1
Methylparaben	0.2
Cetearyl alcohol/Ceteareth-20	0.3
Stearamidopropyl Dimethylamine	0.5
Cetyl Alcohol	2.0
Cetyl/stearyl Alcohol	4.0
Propylparaben	0.1
Phenoxyethanol	0.5
Fragrance	0.75

Mousse

Ingredient	Weight %
Distilled water	QS
Imidazolidinyl Urea	0.5
HEC and Dialkyldimethyl Ammonium Chloride	3.0
Polyurethane polyesterpolyquat	1.0
Isoceteth-20	0.5
Fragrance	0.3

Gel

Ingredient	Weight %
Distilled water	91.6
Disodium EDTA	0.1
Imidazolidinyl Urea	0.5
Carbomer	0.5
Aminomethyl Propanol	0.5
PVPVA copolymer	6.0
Polyurethane polyesterpolyquat	0.5
Fragrance	0.3

Body Wash

Ingredient	Weight %
Polyurethane polyesterpolyquat	1.0
Fatty acids (e.g., Lauric acid, Myristic acid, Palmitic acid, Stearic acid)	20.5
Glycerin	5.0
Potassium hydroxide	5.0
Sodium chloride	2.7
Sodium auroamphoacetate	2.5
Propylene glycol	1.5
Glycol distearate	1.25
Fragrance	1.0
PEG-6	0.5
Triclosan	0.3
Imidazolidinyl urea	0.2
Tetrasodium EDTA	0.05
Distilled water	QS

Lipstick

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Ingredient	Weight %
Polyurethane	0.5
Polyesterpolyquat	
Fatty acid esters (e.g., Octyl palmitate, Isopropyl palmitate, Cetyl lactate, Caprylic/Capric triglyceride)	22.5
Wax (e.g., Beeswax, Candellila, Ozokerite, Carnuba)	18.0
Octyl dimethyl PABA	3.0
Lecithin	0.3
Allantoin	0.2
Preservatives (e.g., BHT, BHA)	0.02
Pigments (e.g., D&C Red No. 6 Barium Lake, D&C Red No. 27 Aluminum Lake, D&C Red No. 21 Aluminum Lake, D&C Red No. 7 Calcium Lake)	11.0
Titanium dioxide	1.0
Oil (e.g., Castor oil, Sesame oil, Soybean oil, Hydrogenated soybean oil, Lanolin oil)	QS

Mascara

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Ingredient	Weight %
Polyurethane	0.3
polyesterpolyquat	
Pentaerythrityl tetrastearate	9.0
Waxes (e.g., Beeswax, Ozokerite, Candelilla, Carnuba)	12.5
Glyceryl stearate	4.7
PVP/Eicosene	4.25
Oleic acid	2.8
Polyisobutane	2.6
Ammonium acrylates copolymer	1.95
Triethanolamine	1.7
Sorbitan sesquioleate	1.0
Benzyl alcohol	0.8
Vitamins (e.g., Panthenol,	0.5

Tocopheryl acetate calcium pantothenate)	
Sodium silicoaluminate	0.5
Sodium hexametaphosphate	0.4
Preservatives (e.g., Methylparaben, Propylparaben)	0.6
Propylene glycol	0.25
AMP-Isostearic hydrolyzed keratin	0.1
Sodium lauryl sulfate	0.05
SD alcohol 40	0.02
Potassium sorbate	0.02
Propylene glycol stearate	0.01
EDTA	0.005
Pigments (e.g., Ultramarines, Carmine)	14
Distilled water	QS

It should be understood that the foregoing description is only illustrative of the present invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the present invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variations that fall within the scope of the appended claims.